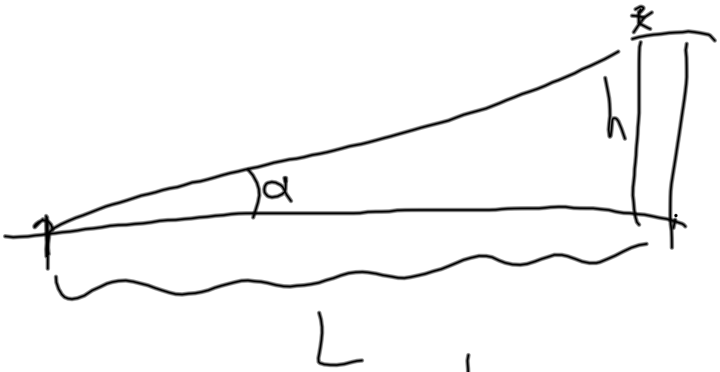


$\frac{h}{L} = \tan\alpha$ so $h = L\tan\alpha$

3.2/1b

$y = \frac{1}{x+1}$

$$f'(x) = \lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{(x+\Delta x) - x} = \lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$$① = \lim_{\Delta x \to 0} \frac{\frac{1}{(x+\Delta x)+1} - \frac{1}{(x)+1}}{\Delta x} \quad ② = \lim_{\Delta x \to 0} \frac{\frac{(x+1)}{(x+\Delta x+1)(x+1)} - \frac{(x+\Delta x+1)}{(x+1)(x+\Delta x+1)}}{\Delta x}$$

$$③ = \lim_{\Delta x \to 0} \frac{\frac{-\Delta x}{(x+1)(x+\Delta x+1)}}{\Delta x} \quad ④ = \lim_{\Delta x \to 0} \frac{-\cancel{(\Delta x)}}{\cancel{(\Delta x)}(x+1)(x+\Delta x+1)}$$

$$⑤ = \lim_{\Delta x \to 0} \frac{-1}{(x+1)(x+\cancel{\Delta x}+1)} \quad ⑥ = \frac{-1}{(x+1)^2}$$

7) mangled somewhere else
8) didn't seriously attempt
9) other

3.2/5) clues

meanings

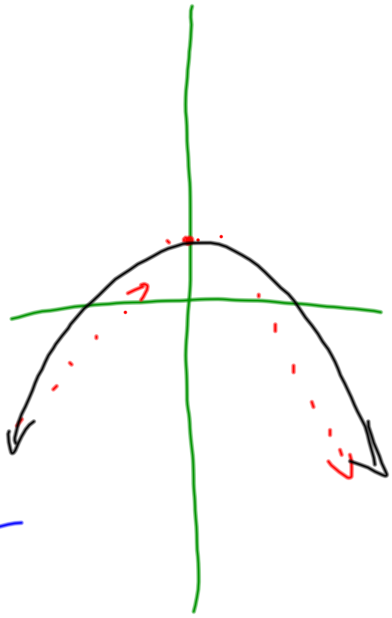
$f(0)=1$ Gotta point $(0,1)$

get horizontal @ $x=0$

$f'(0)=0$ $\Rightarrow$ slope of a tangent line $=0$

$f'(x)>0$ if $x<0$ $\Rightarrow$ slope of tang ln $+$

$f'(x)<0$ if $x>0$ $\Rightarrow$ slope of a tang ln $-$



Or

$y=\cos x$

3.2/81

clues

$f(-2)=3$

$f'(-2)=-4$

find: equation for the tangent line to the graph of $y=f(x)$ at $x=-2$

To write the equation of a line I NEED:

→ slope $= f'(-2) \overset{m=}{=} -4$

→ a point $: f(-2)=3$ $(-2,3)$

the VALUE of the derivative at a point (if it exists) IS the SLOPE of the tangent line at that point.

The eq^n of a line with SLOPE $=m$ At (a,b) IS.

$\left[m=\frac{y-b}{x-a} \right]$

$y-b=m(x-a)$

[point slope form]

$m: f'(-2)=-4$

pt: $(a,f(a))=(-2,f(-2))$
$=(-2,3)$

$y-(3)=-4(x-(-2))$

$y-3=-4(x+2)$

$y-3=-4x-8$
$+3 \quad\quad +3$

$\boxed{y=-4x-5}$

$y=-4x+b$
$3 \quad\quad -2$

$3=-4(-2)+b$
solve for b

3.2/9 $f(x)=3x^2$, $a=3$

You Are Here → $f'(x)=\lim\limits_{w\to x}\dfrac{f(w)-f(x)}{w-x}$

$\dfrac{f(w)-3x^2}{w-x}$

a) $f(x)=3x^2$

$f'(x)=6x$

$\lim\limits_{w\to x}\dfrac{3w^2-3x^2}{w-x}=f'(x)$

$\lim\limits_{w\to x}\dfrac{3\cancel{(w-x)}(w+x)}{1\cancel{(w-x)}}=f'(x)$

$\lim\limits_{w\to x}\dfrac{3(w+x)}{1}=f'(x)$

$\dfrac{3(x+x)}{1}=$

$6x=f'(x)$

b) at $a=3$

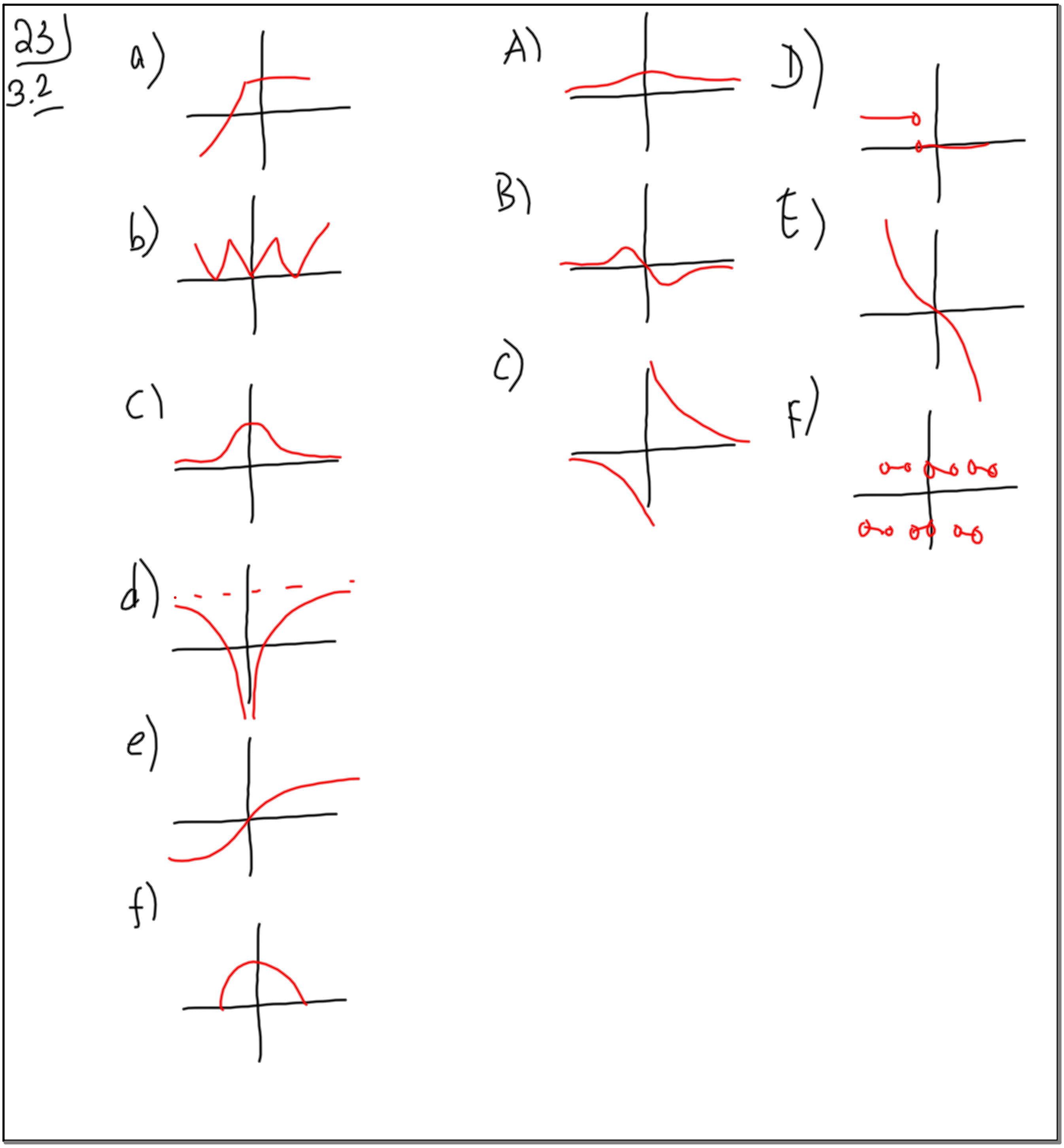
$m=f'(3)=6(3)=18$

$pt=(3,f(3))=(3,3(3)^2)$

$=(3,27)$

$y-f(a)=m(x-a)$

$y-27=18(x-3)$


23)
3.2
a)
b)
c)
d)
e)
f)
A)
B)
C)
D)
E)
F)

3.2/10

$f(x) = x^4$; $a = -2$

$$f'(x) = \lim_{w \to x} \frac{f(w) - f(x)}{w - x}$$

$$f'(x) = \lim_{w \to x} \frac{w^4 - x^4}{w - x} = \lim_{w \to x} \frac{(w-x)(w^3 + xw^2 + x^2w + x^3)}{w - x}$$

$$= \lim_{w \to x} (w^3 + xw^2 + x^2w + x^3)$$

$$= x^3 + x(x^2) + x^2(x) + x^3$$

$$= 4x^3$$

$\frac{w^4}{w} = w^3$ $\frac{xw^3}{w} = xw^2$

$$\begin{array}{r|l} & w^3 + xw^2 + x^2w + x^3 \\ \hline w - x & w^4 \qquad\qquad - x^4 \\ & -(w^4 - xw^3) \\ \hline & xw^3 \qquad - x^4 \\ & -(xw^3 - x^2w^2) \\ \hline & x^2w^2 - x^4 \\ & -(x^2w^2 - x^3w) \\ \hline & x^3w - x^4 \\ & -(x^3w - x^4) \\ \hline & 0 \end{array}$$

b) $a = -2$ WTL

$f(-2) = (-2)^4 = +16$

$f'(-2) = 4(-2)^3 = -32$

ETL

$y - 16 = -32(x - (-2))$